

## *Chesias angeri* Schawerda, 1919 stat. rev., a long neglected species from northern Italy (Geometridae)

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**Abstract.** *Chesias angeri* Schawerda, 1919, has been discovered in north-eastern Italy (Friuli Venezia Giulia) for the first time since its description. The hitherto disputed species is characterized by an invariable unique pattern of the forewing and other external characters that differ from those of the related *C. rufata* (Fabricius, 1775). The male genitalia are very similar to those of *C. rufata*. However, the female genitalia exhibit significant differences and support separate specific status. Morphological characters of both species are figured.

**Zusammenfassung.** *Chesias angeri* Schawerda, 1919, wurde erstmals seit ihrer Beschreibung in Nordostitalien (Friuli Venezia Giulia) wiederentdeckt. Die bisher umstrittene Art zeichnet sich gegenüber der nahe Verwandten *C. rufata* (Fabricius, 1775) durch konstante Zeichnungsunterschiede im Vorderflügel sowie weitere habituelle Merkmale aus. Die männlichen Genitalien sind jenen von *C. rufata* sehr ähnlich, jedoch finden sich in den Weibchen signifikante Differenzen, die einen separaten Artstatus belegen. Morphologische Merkmale beider Arten werden dargestellt.

**Key words.** Lepidoptera, Geometridae, *Chesias angeri*, Italy.

### Introduction

The genus *Chesias* Treitschke, 1825 is restricted to the western Palaearctic region where it comprises ten species (Scoble 1999). However, the taxonomy at the specific and subspecific levels is highly disputed even for the European fauna. Müller (1996) accepted five European species including *C. legatella* (Denis & Schiffermüller, 1775), *C. rufata* (Fabricius, 1775), *C. isabella* Schawerda, 1915, *C. pinkeri* Schawerda, 1939, and *C. zuellichi* Schawerda, 1939. However, according to Hausmann et al. (2005), *C. linogrisearia* Constant, 1888 is accepted as a valid species and *C. zuellichi* is regarded as a synonym of *C. pinkeri*, the latter, at the same time, being downgraded to a subspecies of *C. rufata*. Furthermore, *C. capriata* Prout, 1904 is considered a valid species, and not a subspecies of *C. legatella*.

The regional checklist of the Italian fauna (Raineri & Zangheri 1995) included two species only, viz. *C. legatella* and *C. rufata*. However, according to the above mentioned studies *C. capriata* and *C. linogrisearia* have to be added.

Despite all efforts the identity of another species from Italy remained obscure till now. The taxon described as *Chesias angeri* Schawerda, 1919, was either ignored by authors (Forster & Wohlfahrt 1981; Müller 1996; Raineri & Zangheri 1995), treated as a valid species (Scoble 1999) or considered as a synonym of *C. rufata* (Hausmann et al. 2005), based on the examination of a single male syntype without abdomen (Hausmann *in litt.*, referring to the examination of Viidalepp, the author of the forthcoming volume 3 of Geometrid Moths of Europe). However, the well known Austrian lepidopterist Karl Schawerda described *C. angeri* as a good species, based on three male specimens that

were collected by A. Buchtik on 18th April 1918 at San Quirino, by Prof. F. Anger on 5th May 1918 at Muscoli near Cervignano, and by F. Wagner in May 1918 at Magredis (Schawerda 1919), all localities situated in the north-eastern corner of Italy (provinces of Udine and Pordenone). Additional material collected by Wagner from 10th to 18th April 1918 was not included in the original description (Wagner 1923). The very distinct external appearance left no doubt that it was a new species and Schawerda (1919) figured it in black and white.

For decades no further specimens of *C. angeri* were collected, despite some specific search by Pinker at the type locality Magredis (Kusdas & Thurner 1955). Consequently the latter authors regarded the species to be, possibly, a rare form of *C. rufata*. The lack of material probably contributed significantly to the ignorance and omission of the species in standard European literature. In recent years the second author was able to collect a series of *Chesias* that were tentatively identified as *C. rufata*. Discussions with the first author and examination of several specimens showed the rediscovery of *C. angeri*. Morphological characters such as wing markings and female genitalia leave no doubt as to specific status. Therefore, the species rank is re-established, the taxon is re-described, and the male and female genitalia are figured for the first time.

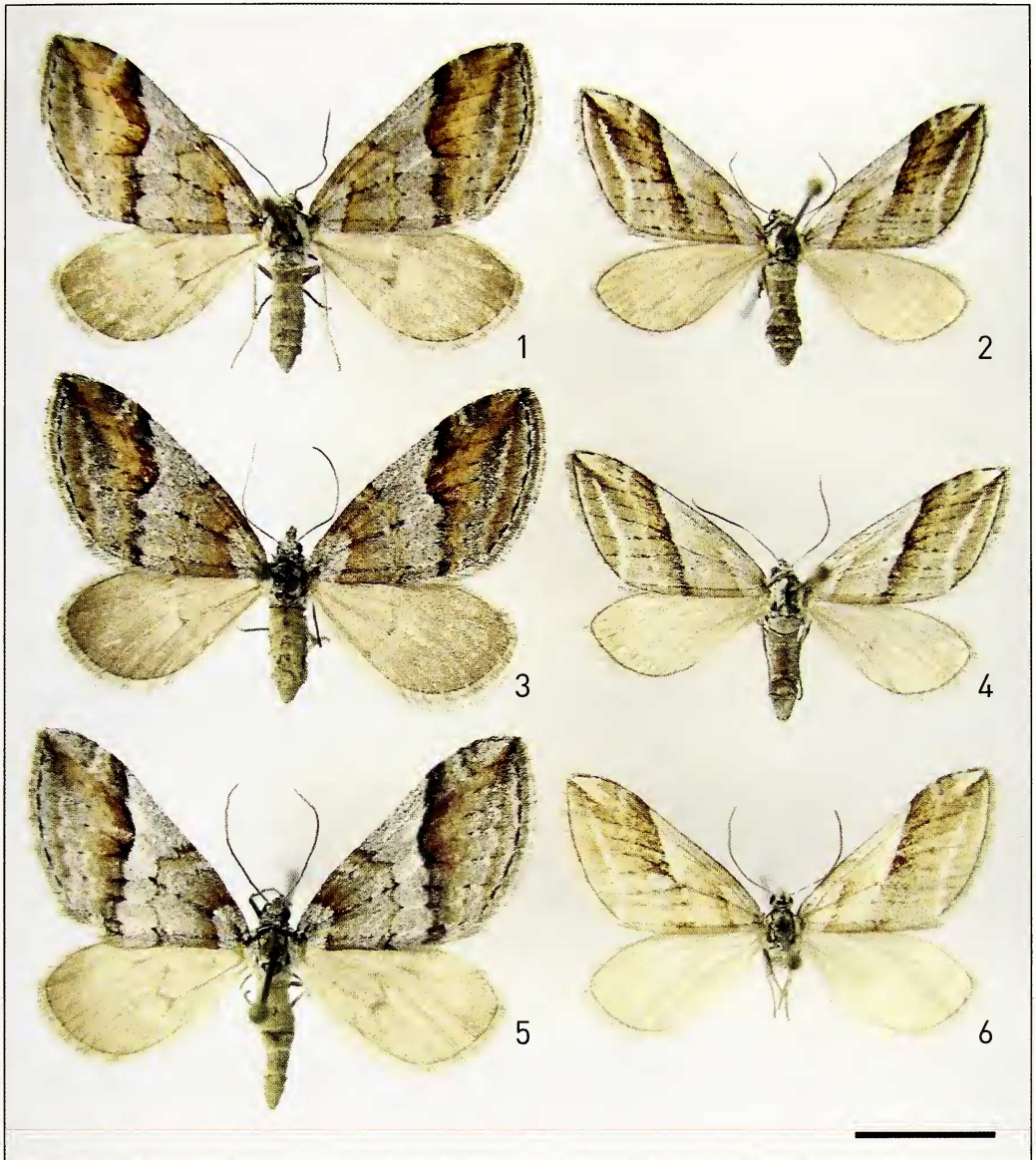
#### ***Chesias angeri* Schawerda, 1919 stat. rev.**

**Material.** 3♂, 5♀, Italy, prov. Udine, Campofornido, 80 m, 16.iv.2000, leg. Morandini; 2♂, 3♀, same data, but 21.iv.2000, 3♂, 3♀, same data, but 23.iv.2000; 2♂, same data, but 9.v.2003 (colls. Museo Friulano di Storia Naturale, Udine; Tiroler Landesmuseum Ferdinandeum, Innsbruck; Zoologische Staatssammlung, München; Morin, Monfalcone). The exact locality is not stated for conservation purposes.

**Redescription.** **Adult** (Figs. 2, 4, 6). **Wingspan:** ♂, 27 mm (n=1); ♀, 25–27 mm (n=5). Labial palpus porrect, brown, ventral and inner surface lighter, greyish brown. Frons, vertex, tegula and thorax greyish brown, mixed with some brown. Abdomen greyish brown, margins of segments lighter. Forewing rather narrow, pointed, termen oblique; ground colour light greyish brown with two darker lines almost parallel to termen; brown, narrow, oblique basal line at one fifth abruptly turned costad near subcosta; medial line almost absent, occasionally indistinctly developed with weakly light rust-brown area towards basal line; dark rust-brown, moderately broad, straight and oblique postmedial fascia from middle of inner margin towards two-thirds of costa; subterminal area with whitish line, slightly curved towards termen at tornus; area between termen and fascia suffused with dark brown scales; dark brown apical streak and dark brown, persistent terminal line present; hindwing light greyish-brown, without distinct markings.

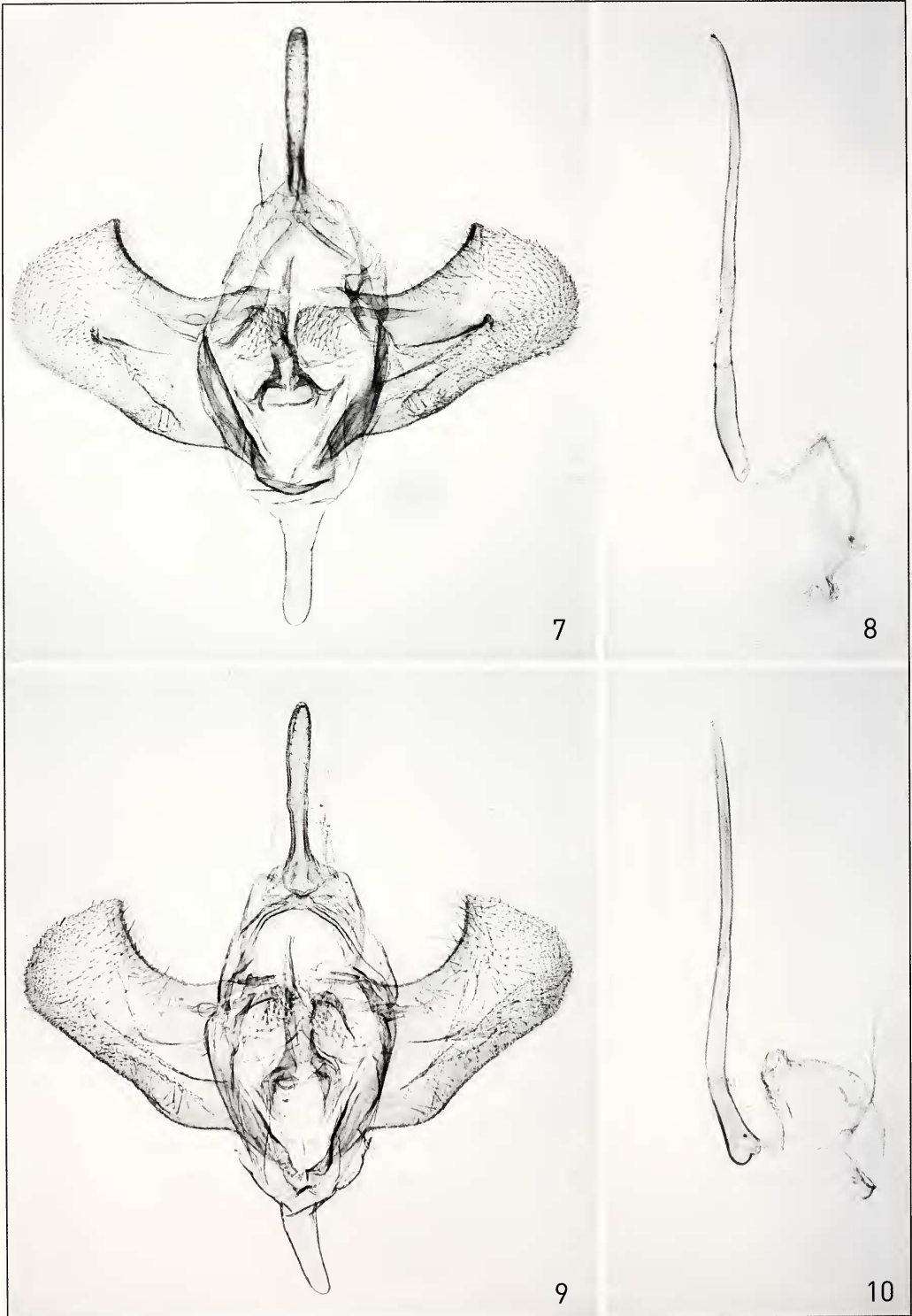
**Genitalia** ♂ (Figs. 9–10). Uncus long, almost clavate; tegumen narrow; valva broad, with sclerotized rod along ventromedial surface, saccular margin basally rounded, distal part slightly emarginated, apex of valva broadly rounded with pointed costal part; transtilla consisting of pair of broad and setose papillae; juxta with prominent, spine-like caudal process, lateral processes absent; vinculum with long, rod-like saccus, slightly shorter than uncus; phallus long and very slender, slightly curved near base.

**Genitalia** ♀ (Fig. 12). Papillae anales small; apophyses posteriores rather long, about two times length of tergum A8; apophyses anteriores short, about half length of



**Figs. 1–6.** Adults of *Chesiata* species. **1, 3, 5.** *Chesiata rufata* (Fabricius, 1775). **2, 4, 6.** *Chesiata angerei* Schawerda, 1919. (scale bar = 1 cm)

tergum A8; tergum A8 sub-rectangular, with convex posterior and concave anterior margin; sternum A7 with broad and convex anterior margin, inserted by slightly sclerotized antrum; ductus bursae short, about length of segment A8, well sclerotized and slightly curved anteriorly, abruptly joining pear-shaped entrance of corpus bursae; corpus bursae large, main part almost globular, densely covered with star-shaped signa, less spinose posteriorly.



**Figs. 7–10.** Male genitalia of *Chesias* species. 7–8. *Chesias rufata* (Fabricius, 1775). 9–10. *Chesias angeri* Schawerda, 1919.

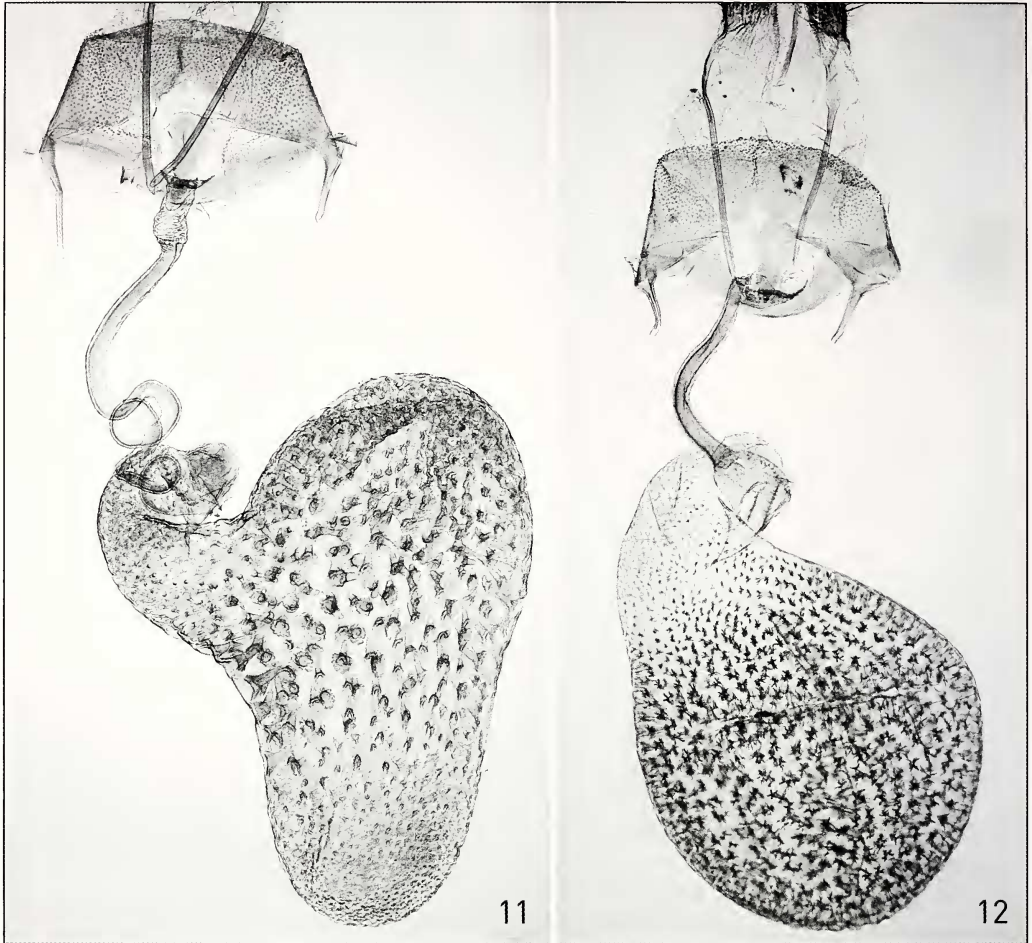
**Differential diagnosis.** *C. angeri* differs from *C. rufata* in numerous external characters (Figs. 1–6) that have all been described in details already by Schawerda (1919). Particularly the dark forewing markings of both species are completely different: the basal line and the post-medial fascia are almost parallel to the termen in *C. angeri* and the ante-medial line of *C. rufata* is completely absent. Furthermore, the distinct postmedial fascia of *C. rufata* is slightly angulate towards the cell and turns straight from about two-thirds of the costa to three-quarters of the inner margin where it ends right-angled. Instead of a slightly curved subterminal line *C. rufata* exhibits a straight whitish wavy line and the dark brown terminal line is interrupted in the latter species whereas it is persistent in *C. angeri*. Finally, *C. angeri* is smaller and more narrow-winged than *C. rufata* and the colour of its hindwings is lighter.

The genitalia are particularly distinct in the females (Figs. 11–12) throughout the genus. *C. angeri* is characterized by a comparatively short ductus bursae meeting the globular corpus bursae in the posterior section. In *C. rufata* the ductus bursae is much longer and caudally coiled, meeting the reniform corpus bursae laterally. The male genitalia of both species are very similar and alleged differences such as in the shape of the valva seem to underplay intraspecific variation (Figs. 7–10). However, only two males of *C. angeri* could be examined so far. The genitalia are also particularly similar to those of *C. rhegmatica* Prout, 1937, from Cyprus, which, however, is completely different externally.

**Distribution.** North-eastern Italy (Fig. 13). Only known from a few closely situated localities: Campofornido (prov. Udine, UTM UL 59); Cervignano del Friuli, Muscoli (prov. Udine, UTM UL 77); Povoletto, Magredis (prov. Udine, UTM UM61); San Quirino (prov. Pordenone, UTM UM 20). Reputedly occurring in Bosnia-Herzegovina (Scoble 1999), but this reference is based on a misinterpretation of the original description. Schawerda (1919) only mentioned that one of his collectors, A. Buchtik, who found the new species in San Quirino, had collected for him in the Herzegovina for several years in earlier times.

**Life history.** The habitat (Fig. 14) of *C. angeri* is permanent xerophilous meadows with a continuous sward and a rich flora of up to 60 species within 100 square meters. This vegetation grows on an alluvial gravel substrate, has never been fertilized, and is mown once or twice a year. Phyto-sociologically it belongs to the *Onobrychis arenariae*-*Brometum erecti* association with numerous xerophilous species such as *Onobrychis arenaria* (Kit.) DC., *Ononis spinosa* L., *Anthyllis vulneraria* ssp. *polyphylla* (DC.) Nyman (Fabaceae), *Thymus pulegioides* L. (Lamiaceae), *Knautia illyrica* Beck (Dipsacaceae), *Dianthus carthusianorum* ssp. *sanguineus* Vis. (Caryophyllaceae), *Filipendula vulgaris* Moench. (Rosaceae), *Bromus erectus* L. (Poaceae) and to signify acidification of the soil also *Genista tinctoria* L. (Fabaceae).

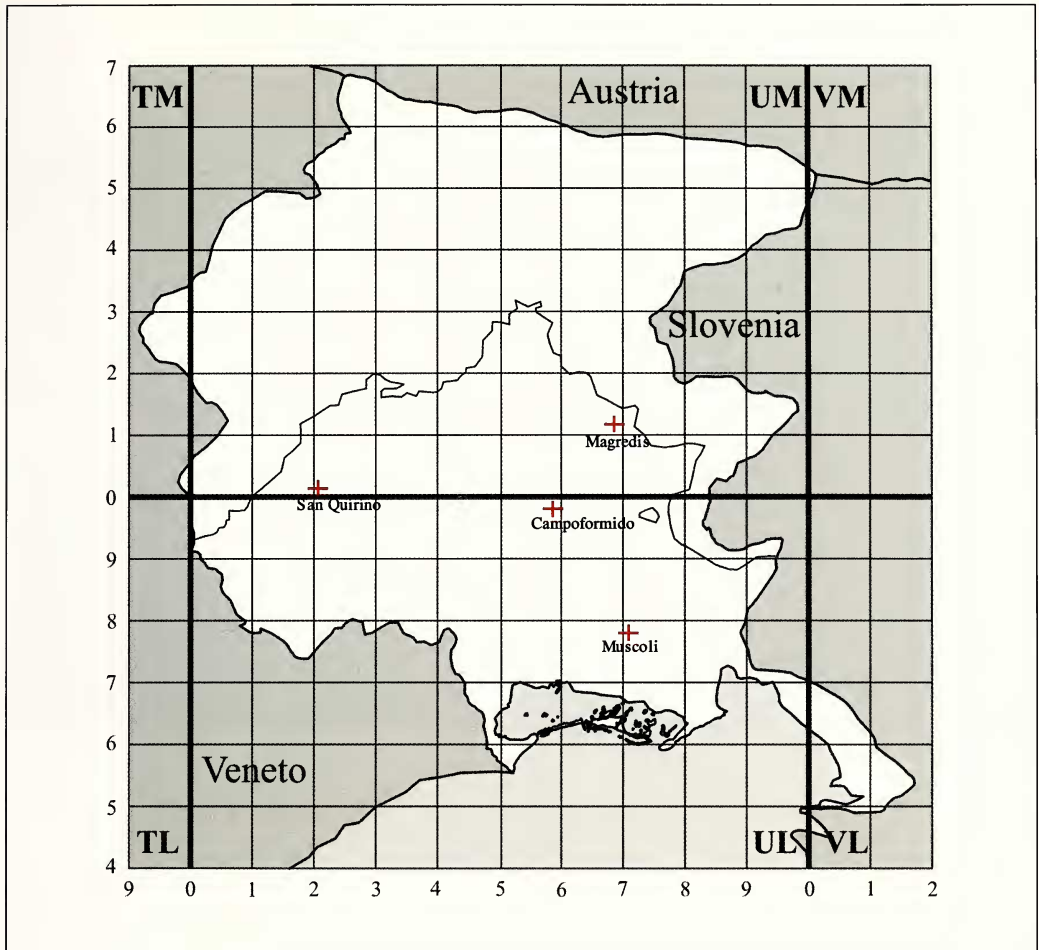
As far as known the larvae of the species of *Chesias* feed on *Cytisus* L. and *Genista* L. (Fabaceae) and those of *C. rufata* have been recorded from *Cytisus scoparius* (L.) Link. (= *Sarothamnus scoparius*) (Wall 1975). The yet undescribed mature caterpillar of *C. angeri* has been found by the second author from late May to mid-June, feeding on the flowers of *Genista tinctoria* L. It is 3 cm long, olive green with a lateral white line, and it has been observed several times and collected with a net on flowers of the



**Figs. 11–12.** Female genitalia of *Chesias* species. **11.** *Chesias rufata* (Fabricius, 1775). **12.** *Chesias angeri* Schawerda, 1919.

host-plant. Pupation took place in the ground and the adults emerged from the end of March to the end of April after the hibernation of the pupae. Wagner (1923) observed a number of specimens flying for short distances when disturbed, or flushed up from vegetation and resting on stalks of *Genista* sp. and other plants. The type locality at Magredis was dominated by *Calluna* Salisb. (Ericaceae) and *Genista* L. according to this author. Similarly, the second author observed the species during daytime. However, considering nocturnal activity patterns in related taxa, it is very likely that the adults are also attracted to light during the night. In the field the adults have been observed from mid-April to the first decade of May, indicating one generation.

**Remarks.** The type material of *C. angeri* could not be found in the collections of the Naturhistorisches Museum, Vienna. One syntype was borrowed for a plate of habitus photographs for the third volume of the book series 'Geometrid Moths of Europe.' The photograph was examined and conspecificity with our new material was confirmed (Hausmann pers. comm.).



**Fig. 13.** Collecting localities of *Cheshias angeri* Schawerda, 1919 (white area: Friuli Venezia Giulia, the northeastern region of Italy).

## Discussion

The rediscovery of a striking species such as *C. angeri* is surprising, particularly within the well explored central European region. However, the faunistic composition of Lepidoptera in the north-easternmost part of Italy is still insufficiently known and numerous remarkable new records and even new species have been found in this area in recent years (Mikkola 1998; Huemer 2002a; 2002b; Huemer & Kaila, 2003; Huemer et al. 2005). Despite a strong human impact and the destruction of large parts of the Friulian plane by intensive agriculture some most remarkable relict habitats that are unique within Europe are restricted to this area. Beside the last large and natural alpine river systems with tremendous gravel shores e.g. along the rivers Tagliamento, Meduna and Cellina, a specialised type of xerophilous meadow (the so-called “magredi”) growing on alluvial gravelly substrate is typical for the central parts of the plane. It varies from discontinuous vegetation to continuous herbaceous covering and is inhabited by a



Fig. 14. Habitat of *Chesias angeri* Schawerda, 1919.

remarkable flora and fauna which even includes some discontinuously distributed local endemic plants, e.g. *Brassica glabrescens* Poldini (Brassicaceae), *Knautia ressmannii* (Pacher) Briq. (Dipsacaceae), *Centaurea dichroantha* A. Kern. and *Leontodon berinii* (Bartl.) Roth. (Asteraceae). However, the lepidopterous community of this habitat type is explored insufficiently though some interesting species have been found recently, e.g. undescribed species of *Apatetris* sp. and *Megacraspedus* sp. (Gelechiidae), *Trifurcula trasaghica* Lastuvka & Lastuvka, 2005 (Nepticulidae), or the first Italian records of *Scrobipalpa halonella* (Herrich-Schäffer, 1854), *Stenoptilia mariaeluisae* Bigot & Picard, 2002 (Pterophoridae) and *Asartodes monspesulalis* (Duponchel, 1833) (Pyralidae). The habitat of *C. angeri* cannot be considered as typical “magredi” but instead an advanced succession stage of xerophilous meadows with continuous vegetation. This kind of habitat is particularly endangered and highly fragmented and even the extent of formerly widely distributed “magredi” in a wider sense has been reduced to less than 1000 ha during the last century.

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